

The Mount John Observatory 'Space Park'

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Introduction

When we think of conservation we often think of waterways, mountains and endangered native species. However, we seldom consider conserving the night sky. New Zealand is often considered at the forefront of both conservation and astronomy. In an attempt to marry these two concepts, Margaret Austin, Alan Gilmore and the New Zealand Starlight Reserve Committee (NZSRC) presented their case for the creation of



The McNaught comet passing through the night sky over Mt John. Photo taken by Pam Kilmartin in 2007 (Gilmore, 2009).

new conservation zones called starlight reserves at a United Nations Educational, Scientific and Cultural Organisation (UNESCO) conference in Paris in 2009. Starlight reserves is a

concept idea in conservation being pushed by several major observatories worldwide of which the Mt John observatory is New Zealand's proposed site. The NZSRC wishes to preserve the night sky and the heritage associated with it at the Mt John Observatory in Tekapo (Austin, Hearnshaw & Murray, 2009). The argument is that New Zealand should recognise the importance of the night sky, not only due to its significance to Maori, but also its significance to Pakeha settlers. For instance, in 1769 Captain James Cook first came to the Pacific to observe the transit of Venus and then to New Zealand to map it as part of the search for the Great Southern Continent and make astronomical observations determining longitude and latitude (Flagler, 2009). For this reason New Zealand can claim that astronomy was a major motivation behind its founding and its settlement by Europeans (Austin in Flagler, 2009).

Background

The observatory at Mt John was originally set up via a grant given to the University of Pennsylvania who were looking to set up a post to view the southern skies in 1960. New Zealand was chosen due to it being located further south of other observatories in South America and Australia. The Tekapo site was chosen due to its high amount of clear nights and for having little light pollution from the town in 1963, and the University of Pennsylvania struck a deal with Canterbury University to co-develop the site. The observatory then opened on the 10th July 1965. By 1975 the University of Pennsylvania had passed over the observatory to Canterbury University's Physics and Astronomy Department (Gilmore, 2009).

One of the main driving factors behind the concept of starlight reserves is that expansion of towns and cities and the streetlight that accompanies it creates 'light pollution' that is quickly eating up our ability to stargaze. This is an issue often overlooked when compared to bigger problems that seem 'closer to home' such as climate change and species extinction. As humans we have gazed at the stars for thousands of years wondering what they are and what else is out there, as yet, undiscovered. We used stars as a form of navigation to track migrating animals, to understand the rise and fall of seasons and to traverse the oceans, although not so much now in the age of technology (Hall, 2004). We have a connection to the stars that I believe many of us have now forgotten. However, the night sky is arguably still of immense cultural significance to us all with the Southern Cross depicted on the New Zealand national flag.

The starlight reserve concept is for observatories to work hand in hand with governments and UNESCO in areas of significant interest to astronomers and establish rules which protect the starlight from light pollution created by nearby towns and cities (Personal communication: Alan Gilmore and Margaret Austin, 30/09/2009). The Mt John Observatory is one of the case studies being suggested to the UNESCO board and is currently still only a potentiality, but the movement is gaining momentum. Margaret Austin, chairwoman of the NZSRC, is hoping for UNESCO to accept the starlight reserve idea into their current heritage protection schemes within the next year (Personal communication: Margaret Austin, 30/09/2009).

The proposed starlight reserves will be composed of three zones in order to reduce human effects on the night sky. These are core,

buffer and external zones. Core zones have little to no lighting or human settlement, with any adverse effects mitigated. Buffer zones also have extensive protection from light through lighting ordinances similar to those already in place at Tekapo village. Finally, the external zones are zones with some human settlement and light pollution, but where mitigation of effects is still possible (Personal communication: Margaret Austin, 15/12/2009).

Issues in planning

As Mt John Observatory is relatively close to the Tekapo township the creation of a starlight reserve at the observatory as a conservation scheme could have significant impacts on planning in the area. However, the Mackenzie District Council and Canterbury University came to an agreement in the 1970's to establish ways of reducing light pollution in the Tekapo area (Personal Communication: Margaret Austin, 15/12/2009). The Mackenzie District Plan recognises the Mt John area as both a site of natural significance and a scenic viewing area (Mackenzie District Plan, 2004). Section 11 of the Mackenzie District Plan (2004) states that increases in outdoor lighting will affect the ability to undertake research at the Mt John Observatory station and so rules limiting how much lighting and when it can be used have been put in place. There are also rules in regard to shielding lights to reflect light back towards the ground. The provisions of these rules are set out in great detail in Section 11, Part 12 stating that outdoor lighting is a permitted activity under the plan as long as it meets shielding and filtering requirements. All new subdivisions must also comply with these standards (Mackenzie District Plan, 2004).

The Waitaha people that have inhabited the Tekapo area for around 1000 years also have a distinct interest in preserving the night sky and have kept records of the stars for many years. So the night sky can also be considered to be protected by the District Plan under the provisions on areas of significance to Maori under the principles of the Treaty of Waitangi (Austin, 2009).

An example of how significant the night sky was to the Waitaha people can be seen in their teachings. The star group Te Kūpenga a Te Ao (Orion) was considered to be the main indicator of safe travel in New Zealand and the arrival of Matariki (Pleiaides) in the eastern skies, around June, signalled the beginning of the Maori new year and indicated when to plant new crops for the following harvests (Austin, 2009). Maori were known by early European settlers to be extremely good navigators over land and water and much of this navigation was by the stars (Austin, 2009, Personal communication: Te Marino Lenihan, 06/08/2009).

Conclusions

The starlight reserve concept is one that should be of interest to planners. Lake Tekapo and an observatory in Austria are the only two mixed site observatories, an observatory which has human settlement nearby, currently involved in pushing for the creation of starlight reserves. All other observatories interested in creating starlight reserves are situated well away from human settlements (Personal Communication: Margaret Austin, 15/12/2009). This means that New Zealand has an opportunity to be at the forefront of planning and mitigating effects. In the Lake Tekapo case study, rules have already been set in place to

protect the night sky. The main issue for planning may arise if the idea of starlight reserves spread. It would be a mammoth task to change our current outdoor lighting and install new lighting with shielding and low intensity bulbs. It could also incur large costs and provide new challenges for planners. However, the benefits may far outweigh the consequences, not just for the night sky but also for long term costs. Reducing light pollution adds to the arguments for upgrading to more efficient low intensity lighting, actually helping in our efforts to become a cleaner, greener New Zealand. Starlight reserves might also boost tourism and offer greater diversity in community open space facilities. We have learnt a lot from the stars throughout human history and there is still much to learn. Arguably we all have a right to stargaze and starlight reserves are probably the best way to maintain an unpolluted night sky in areas such as Mt John observatory. As Richard Hall remarked in his book 'How to gaze at the Southern Stars';

Human beings are not something separate from the rest of the universe; we are part of it.... Raised to a level of consciousness, we are the universe looking at itself.

With New Zealand's ecotourism buzz beginning to die perhaps 'astrotourism' is the next step for New Zealand's tourism economy. Currently UNESCO has asked for a thematic study on the potential impacts of spaceparks to be conducted by involved parties. This is set to be completed by February 2010 and then UNESCO is looking to make a decision on whether or not to go ahead with accepting starlight reserves into its current heritage protection programmes (Personal Communication: Margaret Austin, 15/12/2009). With the challenges and would-be opportunities these reserves will create I therefore believe starlight reserves could hold great benefit for New Zealand's future, and interesting challenges for its planners.

References

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